General Modeling Guidelines

The following modeling guidelines have been developed jointly by Mn/DOT Metro Traffic and FHWA to clarify the modeling process, to insure a useable product, and to meets Federal operational analysis requirement for an Interstate Access Request.

Microscopic Model

CORSIM (CORridor SIMulation) is a micro-simulation program that is currently accepted by Mn/DOT and FHWA for operational analysis to satisfy Interchange Access Requests. Other micro-simulation programs would be considered if the purpose and complexity of the project justifies the application of another model. Justification needs to be discussed and approved by FHWA, Mn/DOT and project manager prior to use.

Modeling Meeting

The model limits and time periods will be determined at the initial modeling meeting. Consideration will be given to project type and location, and whether or not it is located in a congested corridor. Changes should be discussed and agreed upon by project manager, FHWA and Metro Traffic.

Assumptions:
1. The modeling analysis will be performed using the latest version of CORSIM.
2. Model should run without errors. The model should work on a balanced traffic network that has reach equilibrium.
3. The basic traffic study, at a minimum, should produce traffic measures for the current year, the opening year, and the 20 years into the future for the existing geometrics. The work will also include the modeling and analysis of the proposed geometrics for the opening year and the 20-year future design year.
4. The boundary conditions, at a minimum, should extend one interchange beyond the project limits. Bottleneck conditions or congestion at the boundary conditions may require modifications to the model to get the simulation to match the existing traffic conditions.
5. Simulations should be performed for the AM and PM peak periods. Typically, the peak periods run from 6:00 -9:00 a.m. and 3:30 – 6:30 p.m. unless the study methodology determines otherwise.
6. The default vehicle type will be modified as outlined in the CORSIM Calibration Parameters write-up.
7. The current fleet composition ie. Truck percentages will be used.

8. Freeway traffic shall be developed based on 15-minute values for a typical day unless otherwise specified in the initial modeling meeting. The data should include all mainline and freeway-ramp detection stations within the project boundaries for both peak-periods. Data should be taken from the previous year whenever possible using late September through October data. The traffic demand data should represent a typical day (Tuesday, Wednesday and Thursday). The data should be screened for, and exclude those days where weather, incidents, and holidays influence the traffic values. Traffic data from the instrumented system should be considered raw data that has <u>not</u> been scrubbed or analyzed for poor or missing data.
9. Turn movement counts that were taken within the last two years will be accepted.
10. Verify that reasonable free flow speed have been entered into the segments and ramp links by checking the link properties.
11. The ramp terminal traffic signals located at the top of the interchange ramps and within the project area shall be coded into the model using current timing information.
12. Ramp metering will be coded using the current ramp metering timing and only applied to the ramp meters currently operation during each peak period.
13. The link-node diagram shall be created on a base map in real work coordinates.
14. Lane schematic shall be created that graphically represent the network and includes all the key design features.
15. O-D matrixes for all freeway entrances and exits must be developed for all freeway models.
16. The existing modeling will be calibrated for a typical weekday (Tuesday, Wednesday or Thursday) during late September through October. Model has reached calibration when the simulated mainline and ramp volumes are within 10% of detector values and speeds are within 20% of calculated speed.
17. A minimum of five (5) simulation runs will be conducted. The average of five run will be used to assemble the MOE Summary Table. The random seed numbers used will be recorded and submitted.
18. Unique project specific features (ITS, Transit, high occupancy vehicle etc.) will be incorporated in the model as determined at the initial modeling meeting.
19. The forecasted numbers should be submitted and approved to Metro Planning (Gene Hicks) Gene.Hicks@dot.state.mn.us prior to use.
20. Quality control procedures shall be in-place to ensure the model has been accurately developed.
21. The model shall conform to the process outlined in the Advanced CORSIM manual.

Deliverables:
The modeling deliverables are briefly summarized below and do not include the detailed information or format. This information can be found in the Advanced CORSIM manual.
1. Scenario write-up
2. Link-node diagram
3. Lane schematics
4. QA/QC sheets
5. Balanced Traffic Demand dataset for freeway volumes and arterial turning movements
6. O-D Matrixes
7. CORSIM (filename.trp files) and Synchro files (filename.sy6)
8. Calibrated model, written or oral report on calibration procedured used and supportive statistics
9. Random seed numbers
10. Freeway and Arterial summary tables and graphics of the MOEs.
11. Alternative summary table and/or graphics of MOEs

Resources and Information Available
1. External clients can extract freeway detector data (volume, density and speed) and ramp control data at the Mn/DOT's Water Edge Facility. The data extraction workstation is located on the 2nd Floor in Traffic Engineering. We request that data extraction be conducted during off-peak hours and on working days. Data should be screened for weather and major incidents during late Sept. through October. Instruction are available at the workstation and will be available on-line in the near future.

2. Current timing and phasing information for any traffic signals operated by Metro Division is available by contracting the Metro Signal Operations at:
    East Metro (651) 634-2134 or
    West Metro (651) 634-2131.

3. Turning movement counts are available on the Mn/DOT Metro Division web site: http://www.dot.state.mn.us/metro/warrant or by contacting Metro Traffic at (651) 634-2144. Do not use traffic or turning movement counts more than two (2) years old.

4. Fleet composition ie. Truck percentages are available by contacting Mn/DOT Central Office at (651) 296-8535. or visit Mn/DOT 's TDA website:
    http://www.dot.state.mn.us/tda/maps/trafficvol.html

5. Forecasted values should be reviewed and approved by Metro Planning. Submit the spreadsheet, growth rates used and trip distribution assumptions to:
    gene.hicks@dot.state.mn.us.

6. Forward modeling files (CORSIM and Synchro) and supportive information and data to Metro Traffic at the following E-mail address: kevin.sommers@dot.state.mn.us. Carbon copy linda.taylor@dot.state.mn.us.